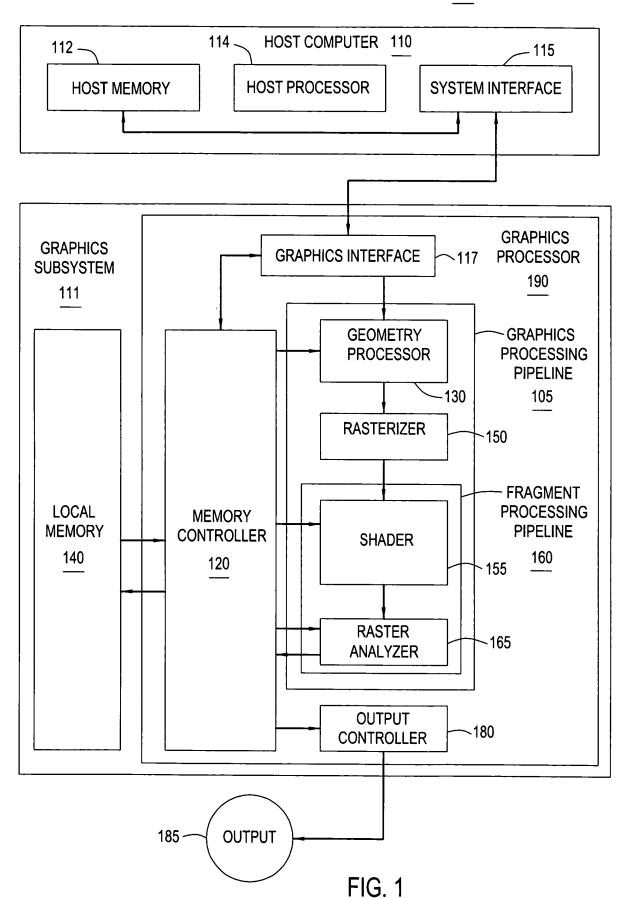Atty Dkt. No.: NVDA-P000735
U.S. Serial No.: Unknown   Conf. No.: Unknown
Filed: Herewith
Title: SYSTEM AND METHOD FOR PROCESSING DIVERGENT SAMPLES IN A PROGRAMMABLE GRAPHICS PROCESSING UNIT
Inventor: John Erik Lindholm
Express Mail No.:   EV 323864095 US   Page 1 of 14

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100

FIG. 1

FIG. 2

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Inventor: John Erik Lindholm
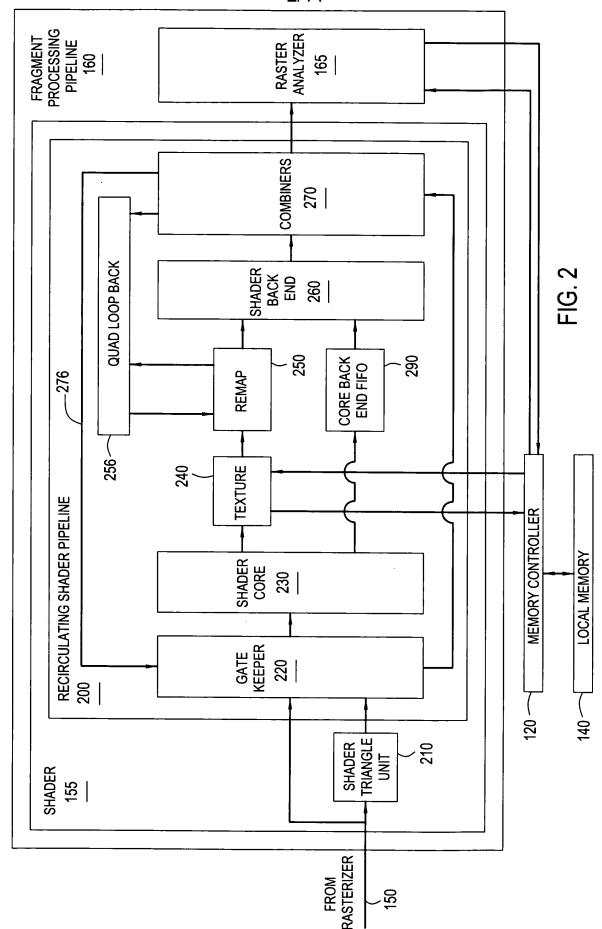Express Mail No.: EV 323864095 US Page 3 of 14

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INSTRUCTIONS ⟋ 306

302

PC	
	INST A
	INST B
	CALL/RETURN C
	CALL/RETURN D
	INST E

⟋ 300

PC	CODEWORDS

302   304
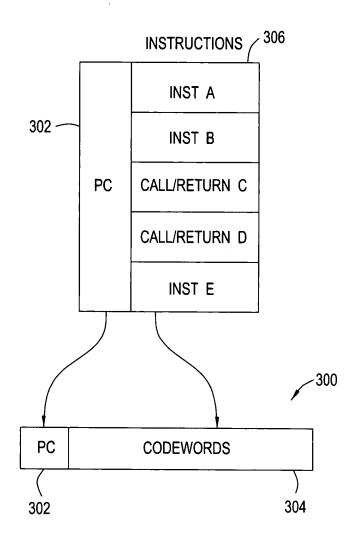
FIG. 3

Atty Dkt. No.:   NVDA-P000735
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Inventor: John Erik Lindholm
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FIG. 4

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U.S. Serial No.: Unknown   Conf. No.: Unknown
Filed: Herewith
Title: SYSTEM AND METHOD FOR PROCESSING
DIVERGENT SAMPLES IN A PROGRAMMABLE GRAPHICS
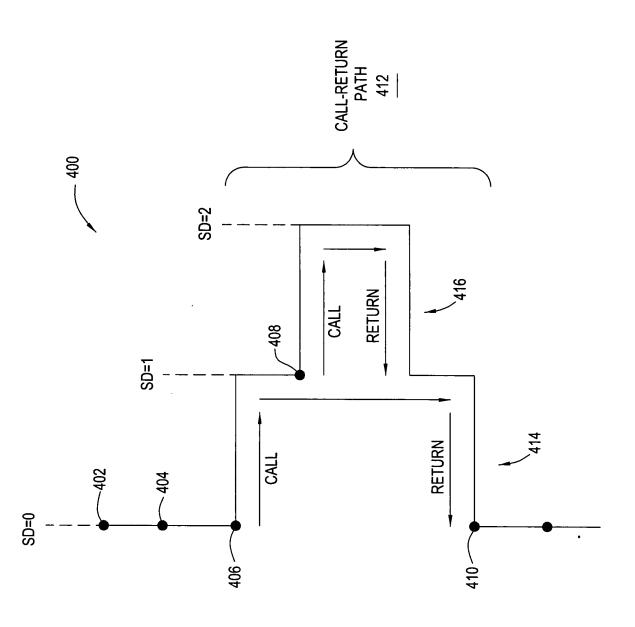PROCESSING UNIT
Inventor: John Erik Lindholm
Express Mail No.: EV 323864095 US   Page 5 of 14
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FIG. 5

Atty Dkt. No.:   NVDA-P000735
U.S. Serial No.:   Unknown   Conf. No.: Unknown
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PROCESSING UNIT
Inventor: John Erik Lindholm
Express Mail No.:   EV 323864095 US   Page 6 of 14

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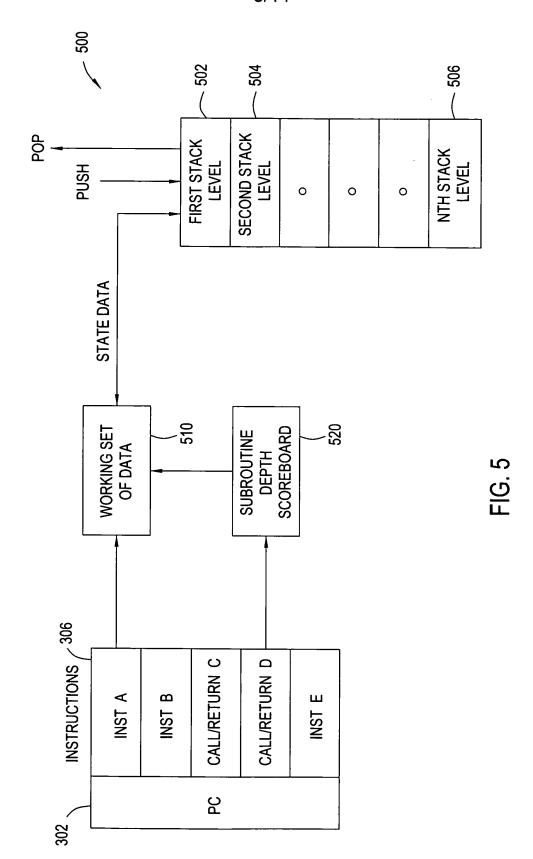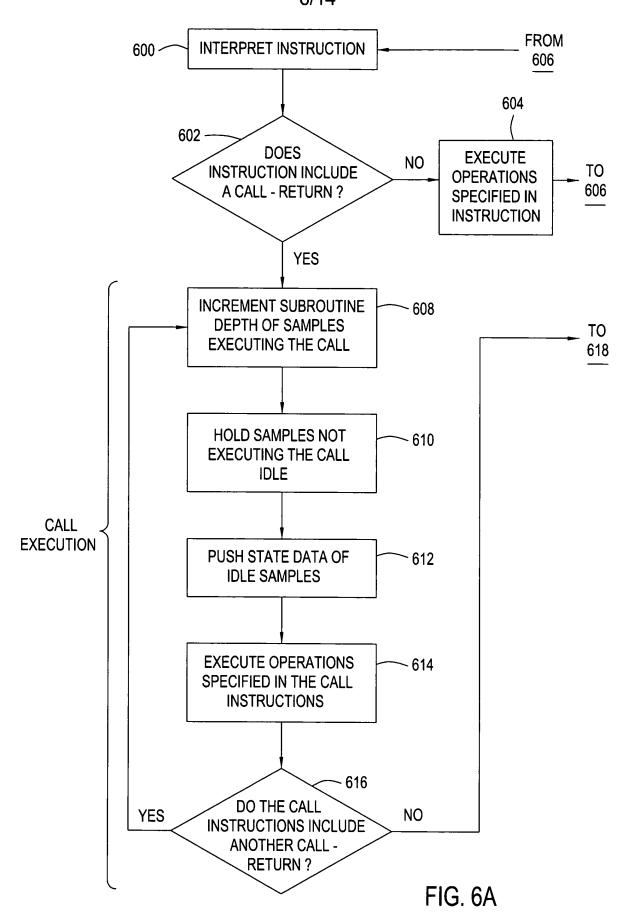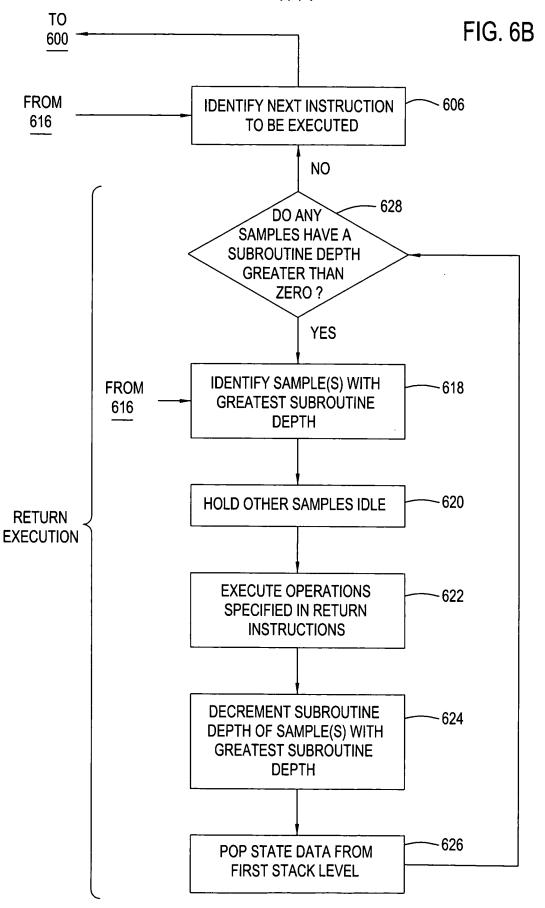600 — INTERPRET INSTRUCTION ←———— FROM 606

602 — DOES INSTRUCTION INCLUDE A CALL - RETURN ?

NO → EXECUTE OPERATIONS SPECIFIED IN INSTRUCTION — 604 → TO 606

YES

INCREMENT SUBROUTINE DEPTH OF SAMPLES EXECUTING THE CALL — 608

TO 618

HOLD SAMPLES NOT EXECUTING THE CALL IDLE — 610

PUSH STATE DATA OF IDLE SAMPLES — 612

CALL EXECUTION

EXECUTE OPERATIONS SPECIFIED IN THE CALL INSTRUCTIONS — 614

616 — DO THE CALL INSTRUCTIONS INCLUDE ANOTHER CALL - RETURN ?

YES

NO

FIG. 6A

Atty Dkt. No.: NVDA-P000735
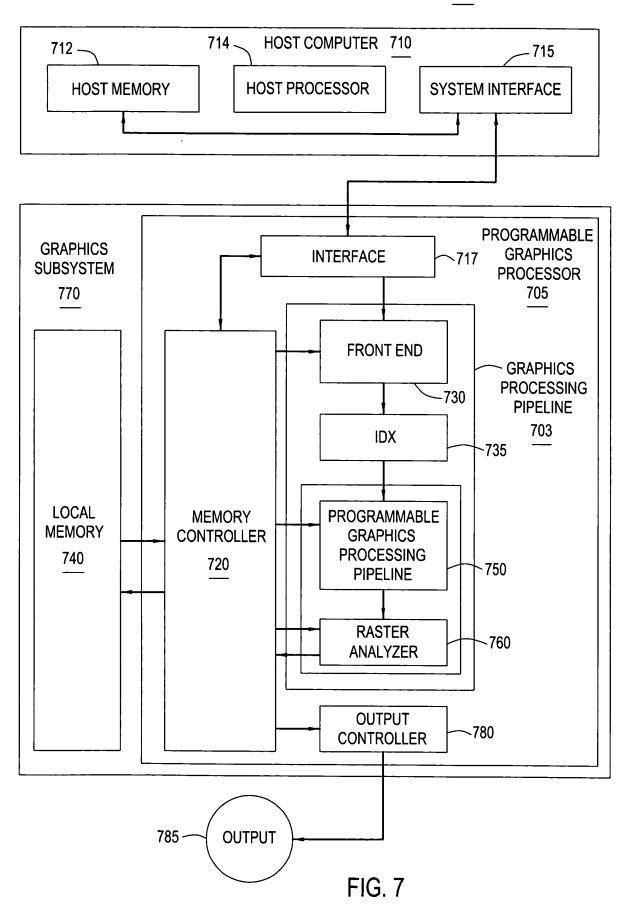**U.S. Serial No.:** Unknown **Conf. No.:** Unknown
Filed: Herewith
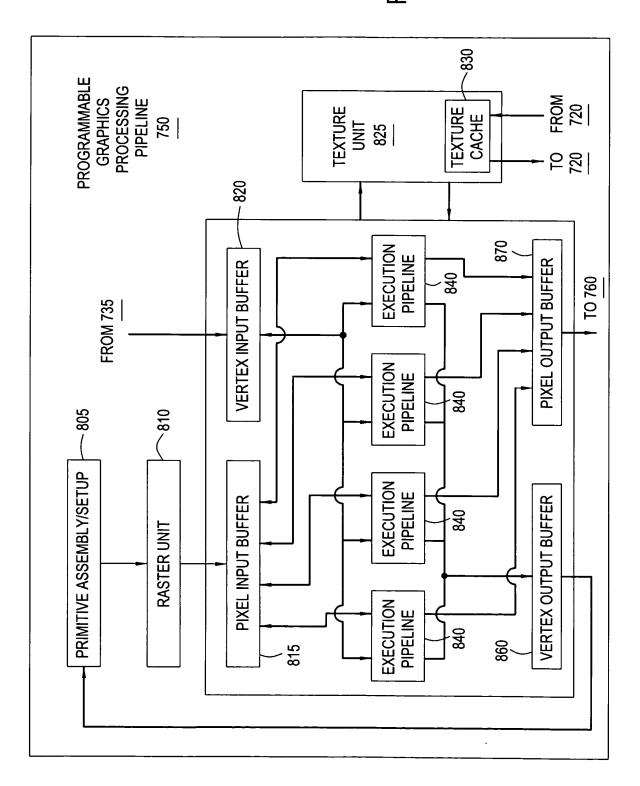**Title:** SYSTEM AND METHOD FOR PROCESSING
DIVERGENT SAMPLES IN A PROGRAMMABLE GRAPHICS
PROCESSING UNIT
Inventor: John Erik Lindholm
Express Mail No.: EV 323864095 US **Page 7 of 14**

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TO
600

FIG. 6B

FROM
616

IDENTIFY NEXT INSTRUCTION
TO BE EXECUTED — 606

NO

DO ANY
SAMPLES HAVE A
SUBROUTINE DEPTH
GREATER THAN
ZERO ? — 628

YES

FROM
616

IDENTIFY SAMPLE(S) WITH
GREATEST SUBROUTINE
DEPTH — 618

HOLD OTHER SAMPLES IDLE — 620

RETURN
EXECUTION

EXECUTE OPERATIONS
SPECIFIED IN RETURN
INSTRUCTIONS — 622

DECREMENT SUBROUTINE
DEPTH OF SAMPLE(S) WITH
GREATEST SUBROUTINE
DEPTH — 624

POP STATE DATA FROM
FIRST STACK LEVEL — 626

700

HOST COMPUTER 710

712 — HOST MEMORY   714 — HOST PROCESSOR   715 — SYSTEM INTERFACE

GRAPHICS SUBSYSTEM
770

PROGRAMMABLE GRAPHICS PROCESSOR
705

INTERFACE —717

FRONT END 730

GRAPHICS PROCESSING PIPELINE
703

IDX 735

LOCAL MEMORY
740

MEMORY CONTROLLER
720

PROGRAMMABLE GRAPHICS PROCESSING PIPELINE 750

RASTER ANALYZER 760

OUTPUT CONTROLLER 780

785 — OUTPUT

FIG. 7

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Inventor: John Erik Lindholm
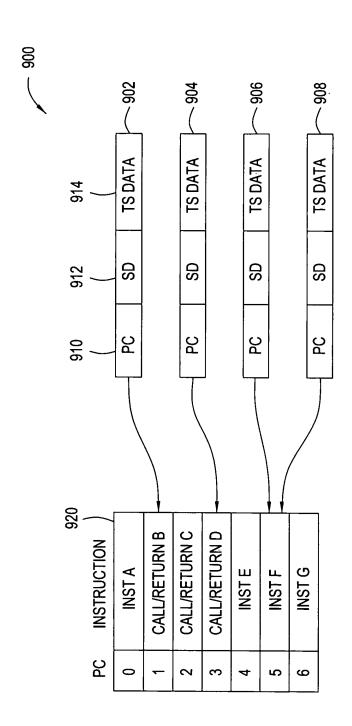Express Mail No.:   EV 323864095 US   Page 9 of 14
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FIG. 8

FIG. 9

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Inventor: John Erik Lindholm
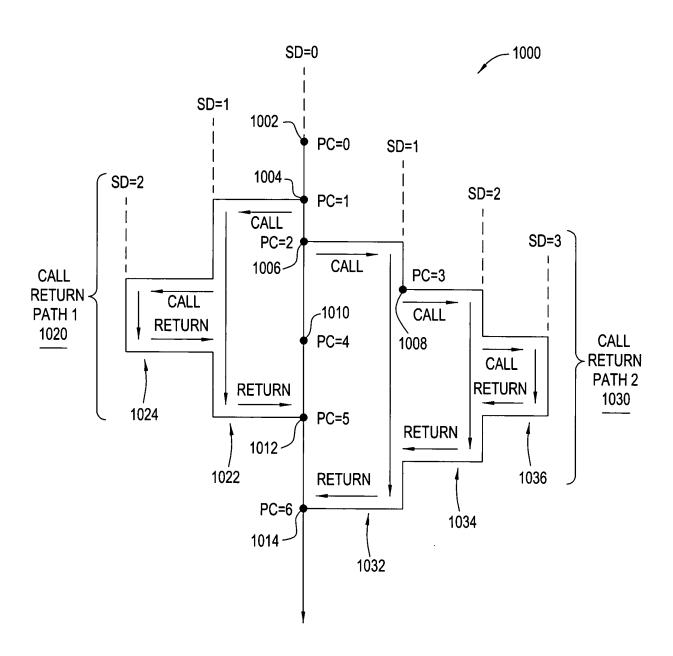Express Mail No.: EV 323864095 US   Page 11 of 14
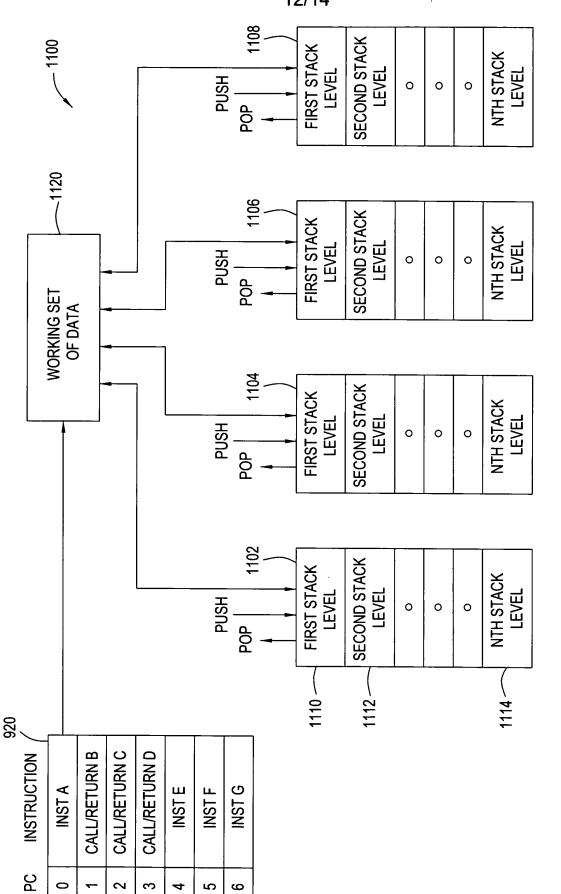
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FIG. 10

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U.S. Serial No.: Unknown   Conf. No.: Unknown
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PROCESSING UNIT
Inventor: John Erik Lindholm
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FIG. 11

ADFG

FIG. 12

Atty Dkt. No.:   NVDA-P000735
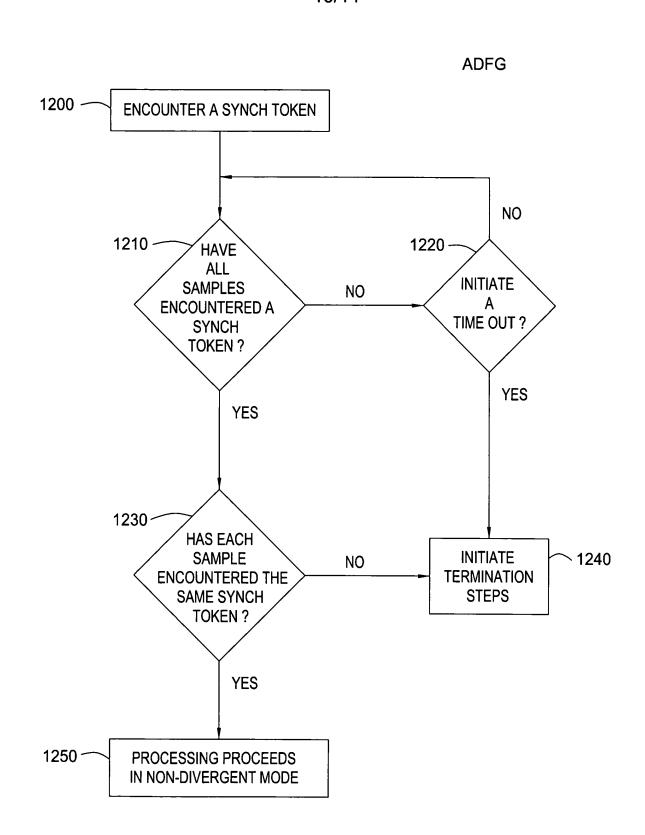U.S. Serial No.:   Unknown   Conf. No.: Unknown
Filed: Herewith
Title: SYSTEM AND METHOD FOR PROCESSING
DIVERGENT SAMPLES IN A PROGRAMMABLE GRAPHICS
PROCESSING UNIT
Inventor: John Erik Lindholm
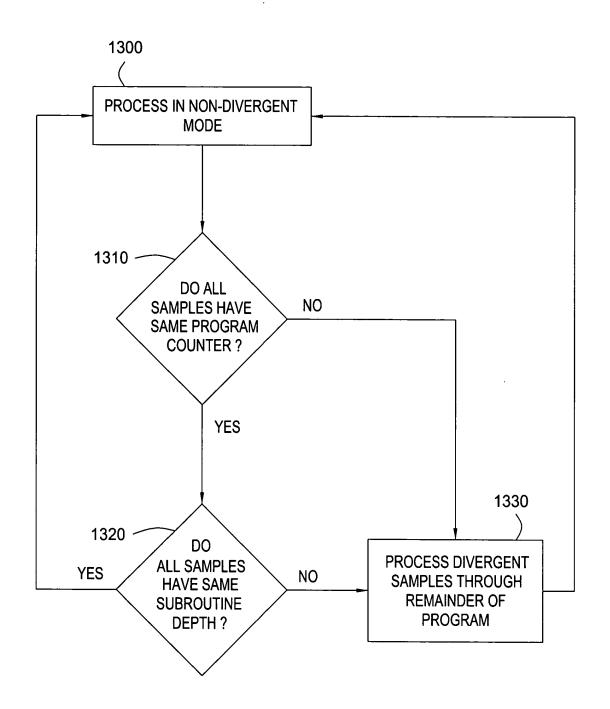Express Mail No.:   EV 323864095 US   Page 14 of 14
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1300

PROCESS IN NON-DIVERGENT
MODE

1310

DO ALL
SAMPLES HAVE
SAME PROGRAM
COUNTER ?

NO

YES

1320

DO
ALL SAMPLES
HAVE SAME
SUBROUTINE
DEPTH ?

YES

NO

1330

PROCESS DIVERGENT
SAMPLES THROUGH
REMAINDER OF
PROGRAM

FIG. 13